

REMARKS

Favorable reconsideration and withdrawal of the outstanding rejections to the subject application are requested in view of the preceding amendments and the following remarks.

Claims 1-18 are pending in this application, with Claims 1, 4, 5 and 12 being independent. Claims 1, 3-5, 7-9, 12, 14, and 15 are amended herein only to correct minor errors. These amendments are not for any purposes related to patentability. The specification has also been amended to attend to matters of form. Support for the amendments can be found in the application, as filed. No new matter has been added.

Claims 1-7, 10-14, 17 and 18 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Koyano et al. (JP 2002-079739) in view of Osumi et al. (U.S. Patent No. 6,280,513). Claims 8, 9, 15 and 16 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over the same two references and further in view of Matzinger (U.S. Patent No. 6,020,397). Applicants traverse these rejections.

In one aspect, Applicants' invention, as recited in claim 1, relates to a reaction solution for use in image recording in connection with an ink containing a coloring material in a dissolved or dispersed state. The reaction solution, after contacting the ink, destabilizes the dissolved or dispersed state of the coloring material in the ink. The reaction solution contains at least a polyvalent metal ion and a nonionic polymer. The K_a value of the reaction solution according to the Bristow method is from $1.3 \text{ mL} \cdot \text{m}^{-2} \cdot \text{msec}^{-1/2}$ to $3.0 \text{ mL} \cdot \text{m}^{-2} \cdot \text{msec}^{-1/2}$, inclusive. The viscosity of the reaction solution is from 20 mPa·s to 150 mPa·s, inclusive.

In other aspects of Applicants' invention, independent claim 4 relates to a set of an ink and a reaction solution of comparable scope, independent claim 5 relates to an ink jet recording apparatus comprising a recording head for discharging an ink and means for supplying a reaction solution of comparable scope, and independent claim 12 relates to an image recording method comprising the steps of coating a recording medium with a reaction solution of comparable scope, and coating the ink on the recording medium by an ink jet method.

The present invention seeks to solve the technical problem that when a reaction solution containing a polyvalent metal ion and a nonionic polymer is applied to normal paper by roller coating, the resultant images tend to have an uneven image density. (See, e.g., page 3, line 7, to page 4, line 20, of the specification.) Applicants submit that a person of skill in the art would have tried to solve this problem by reducing the penetration of the reaction solution into the paper, in order to enhance contact between the ink and the reaction solution for sufficient reaction between the coloring material and the reaction solution. Applicants, however solved the problem by means of the above-noted features of the present invention.

The Examples and Comparative Examples demonstrate the importance of the various features recited in the present invention. Specifically, reaction solutions having a smaller K_a value ($1.2 \text{ mL} \cdot \text{m}^{-2} \cdot \text{msec}^{-1/2}$ in Comparative Example 1 and $1.1 \text{ mL} \cdot \text{m}^{-2} \cdot \text{msec}^{-1/2}$ in Comparative Example 2), a larger K_a value ($3.1 \text{ mL} \cdot \text{m}^{-2} \cdot \text{msec}^{-1/2}$ in Comparative Example 6), a smaller viscosity ($12 \text{ mPa} \cdot \text{s}$ in Comparative Example 3 and $19 \text{ mPa} \cdot \text{s}$ in Comparative Example 5), or a larger viscosity ($156 \text{ mPa} \cdot \text{s}$ in Comparative Example 4) than what is recited in the independent claims did not achieve the advantages of the present invention. See Tables 1 and 2 at pages 44 and 47 of

the specification. Applicants submit that this shows the criticality of the ranges of the values recited in the present invention.

Applicants submit that the cited documents do not teach or suggest the claimed invention.

Koyano et al. relates to a reaction solution reactive with a coloring material in an ink. That document mentions a very broad range of viscosities, such as from 10 mPa.s to 100,000 mPa.s. As noted in this Office Action, however, Koyano et al. does not disclose specific Ka values of the reaction solution. Instead, Osumi et al. is cited for its teaching that the Ka value of an ink is not more than 1.5.

In light of these two documents, the Office Action takes the position that the present invention is obvious on the grounds that Koyano et al. teaches a range of viscosities that includes the claimed viscosity and that Osumi et al. teaches a range of Ka values that overlaps with the claimed range of Ka values. Applicants disagree.

Under established Federal Circuit precedent, “obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so.” ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (emphasis in original). Accordingly, “[t]he mere fact that [] prior art could be modified would not [make] the modification obvious unless the prior art suggested the desirability of the modification.” In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). In addition, it is improper to “use hindsight reconstruction to pick and choose among isolated disclosures in the

prior art to deprecate the claimed invention,” In re Fine, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), because to do so would be “simply to use that which the inventor taught against its teacher.” W. L. Gore v. Garlock, Inc. 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983).

While Koyano et al. and Osumi et al. may teach overlapping ranges, Applicants’ invention would not be obvious in light of their teachings. For starters, of the broad range of viscosities taught by Koyano et al., only over a relatively very narrow range are the meritorious effects of the present invention obtained. For example, the viscosity value of 10 mPa.s is below even 12 mPa.s and 19 mPa.s, which, as shown in Comparative Examples 3 and 5, are unsatisfactory for Applicants’ invention. Similarly, 100,000 mPa.s is well above 156 mPa.s, which was found in Comparative Example 4 to be unsatisfactory in Applicants’ invention. While Applicants note that some reaction solutions used in the examples of Koyano et al. show viscosity values within the range specified in Applicants’ claimed invention, all of the reaction solutions used in those examples are understood to contain too small an amount of the material for imparting a permeation property, and would, therefore, be understood to have a Ka value below the lower limit of the range specified in the present invention.

Regarding Osumi et al., Applicants note that the Ka value disclosed is for an ink, and not for reaction solution. Moreover, the value is intended to prevent permeation of an ink as much as possible, for obtaining a higher optical density. Such a technique, however, is contrary to that of the present invention, in which penetration of the reaction solution, to a certain extent, is intended. Moreover the Ka values of 1.2 and 1.1 in Comparative Examples 1 and 2 of the

present invention fall within the preferred range of Osumi et al., but the beneficial effect of the present invention is not obtained in those examples.

Thus, Applicants submit that the claimed invention recites combined viscosities and Ka values that would not be obvious from Koyano et al. and Osumi et al. The Office Action is merely picking and choosing features from each of Koyano et al. and Osumi et al., while as shown in Applicants' Examples and Comparative Examples, the claimed combination of viscosity and Ka values, as specifically set forth in the independent claims, is not taught or suggested by either of those documents.

Applicants further submit that Matzinger, which is cited for its teaching regarding pH of the reaction solution being lower than that of the ink and regarding viscosity of the reaction solution being greater than that of the ink, does not remedy the deficiencies of the Koyano et al. and Osuma et al. combination.

Accordingly, the cited references do not teach or suggest the claimed invention, either singly or in the combinations proposed by the Examiner, assuming such combinations are proper. Applicants therefore respectfully request that the Section 103 rejections be withdrawn.

Applicants submit that the present invention is patentably defined by independent Claims 1, 4, 5 and 12 for the reasons discussed above. The dependent claims are also submitted to be patentable for the same reasons as their respective independent claims and for other patentable features set forth therein. Individual consideration of each dependent claim is requested.

Applicants request favorable reconsideration, withdrawal of all rejections, and passage to issue of the above-identified application.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "M. J. Didas", is written over a horizontal line.

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